

Appendix A

Maneuver and Fire Support Equipment Substitution Matrices

The matrices in this appendix illustrate some of the different equipment options available to scenario and order of battle developers. Although this organization guide provides a baseline of widely-used systems produced in the former Soviet Union (FSU), the intent of the capabilities-based OPFOR is to allow users to tailor their orders of battle by substituting other worldwide systems. Deviations from the baseline systems should relate to specific training objectives. For example, users may seek to mirror the actual mix of equipment found in a particular region or to introduce a particular weapons capability or vulnerability.

The matrices list most of the major **baseline** systems in the organization guide and provide a number of potential substitutes for each. While the lists of **potential substitutes** are not all-inclusive, they contain most common systems that have roughly **comparable** capabilities. They also contain some **alternative** systems that may perform the same missions (with greater or lesser capability) or have different capabilities for special uses. Entries may include system name, caliber of main armament, vehicle mount (for self-propelled systems), and digraph for country of origin. Entries within the alternative category also include one of the following symbols identifying each system's capabilities in relation to the baseline:

- (+) More capable.
- (-) Less capable.
- (*) Different capabilities for special uses.

Users substituting systems from the matrices or considering other foreign weapons systems for use in an OPFOR order of battle should evaluate candidate substitutes against the following criteria

- **Is the system available to potential adversaries?** To satisfy this criterion, the system should be in service with the armed forces of countries traditionally hostile to the United States or widely exported on the world market.
- **Does the system exist in large enough quantities to justify training against it?** At a minimum, total system production should at least equal the numbers contained in a proposed order of battle. Moreover, US military units using currently available equipment generally should not train against foreign developmental systems that have not reached initial operational capability (IOC).
- **Does the mix and variety of systems in an order of battle conform to some logical pattern?** Some users constructing a large order of battle may want to pattern the mix of system types and generations on some actual country. Others may wish to standardize systems throughout the order of battle for simplicity or ease in modeling. In any case, the systems portrayed generally should be in unit sets of regimental or battalion size. Because of the logistics and training challenges involved in supporting a weapon system, users should avoid excessive variety.

Users should keep in mind that substitutions for major weapons systems may also affect the types and numbers of supporting systems.

Medium Tank Substitution Matrix

| Baseline Systems | Potential Substitutes | |
|---|--|---|
| | Comparable | Alternative |
| T-55 (100-mm RS) T-62 (115-mm RS) | T-55AM2B (100-mm RS) T-62M (115-mm RS) Centurion (105-mm UK) AMX-30 (105-mm FR) Type 59 (100-mm CH) Type 69 IIM (105-mm CH) M-60A1/3 (105-mm US) | PT-76 Light Tank (76-mm RS)(*) T-34 (85-mm RS)(-) Type 63 Light Tank (85-mm CH)(*) ASU-85 Assault Gun (85-mm RS)(-) M41 Light Tank (90-mm US)(*) SU-100 Assault Gun (100-mm RS)(-) T-72 (125-mm RS) (+) T-80 (125-mm RS) (+) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Light Armored Vehicle Substitution Matrix _____

| Baseline Systems | Potential Substitutes | |
|--|---|---|
| | Comparable | Alternative |
| Infantry Fighting Vehicle BMP-2 (30-mm RS) BMP-1 (73-mm RS) | Warrior (30-mm UK) Marder 1A3 (20-mm GM) BVP M80A (20-mm SR) AMX-10P (20-mm FR) | BMP-3 (30/100-mm RS)(+) BMD-1 (73-mm RS)(*) |
| Armored Scout Car BRDM-2 (14.5-mm RS) | BRDM-1 (7.62-mm RS) V-150 Commando (7.62-mm US) EE-3 (12.7-mm BR) | Alvis Fox (20-mm UK)(+) Shorlund S52 (7.62-mm UK)(*) Wiesel-25 (25-mm GM)(+) |
| Armored Command Vehicle BRM-1K (73-mm RS) | Scorpion (76/90-mm UK) AMX-10 PAC-90 (90-mm FR) EE-9/Cascavel (90-mm BR) | Mobile Recon Post PRP-3/4 (7.62-mm RS)(*) AMX-10 RAC (105-mm FR)(+) |
| Armored Personnel Carrier BTR-80 (14.5-mm RS) BTR-70 (14.5-mm RS) BTR-60 (14.5-mm RS) | VAB (12.7-mm FR) V-300 Commando (14.5-mm US) OT-64C (14.5-mm CZ) PSZH-1V (14.5-mm HU) | BTR-50 (12.7-mm RS)(-) Fuchs (20-mm GM)(+) WZ 551 (25-mm CH)(+) MT-LB (7.62-mm RS/BU)(*) M113 (7.62-mm US)(*) BTR-152K (12.7-mm RS)(*) FMC AIFV (12.7/25-mm TU/BE)(+) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Mortar Substitution Matrix

| Baseline Systems | Potential Substitutes | |
|---|-----------------------|---|
| | Comparable | Alternative |
| Light Mortar Type M-83A (60-mm CH) | Al Jaleel (60-mm IZ) | M2 (60-mm US)(-) M-90 (60-mm SR)(+) MO-120-60 (60-mm FR)(+) AML-60-20 (60-mm FR)(*) |
| M1937 (82-mm RS) | M29A1 (81-mm US) | M125A1/A2 (81-mm/M113 US)(*) MO-81-61L (81-mm FR)(+) |
| 2B9 (82-mm Automatic RS) | None | 2B9M (82-mm/MT-LB HU)(*) |
| M1943 (120-mm RS) 2S12 (120-mm/GAZ-66 RS) | Al Jaleel (120-mm IZ) | M-74 (120-mm SR)(+) MO-120-RT-61 (120-mm FR)(+) B1.10.74 (120-mm/MT-LB BU)(*) 2B16 (120-mm Combo Gun RS)(*) 2S23 (120-mm SP Combo Gun/ BTR-80 RS)(*) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Towed Artillery Substitution Matrix

| Baseline Systems | Potential Substitutes | |
|---|---|--|
| | Comparable | Alternative |
| D-30 (122-mm RS) | BS-3 (100-mm RS) LG-1 (105-mm FR) D-74 (122-mm RS) | M48 Tito Gun (76-mm SR)(-) D-48 (85-mm RS)(-) M101 (105-mm US)(-) M1938/M-30 (122-mm RS)(-) |
| D-20 (152-mm RS) | M198 (155-mm US) | ML-20 (152-mm RS)(-) D-1 (152-mm RS)(-) 2A65 (152-mm)(+) M114 (155-mm US)(-) |
| 2A36 (152-mm RS) | Type 83 (152-mm CH) M46/84 (155-mm SR) GHN-45 (155-mm AU) | M-46 (130-mm RS)(-) A-19 (122-mm RS)(-) 2A65 (152-mm)(+) |
| S-23 (180-mm RS) | None | M1931/B-4M (203-mm RS)(*) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Self-Propelled Artillery Substitution Matrix_____

| Baseline Systems | Potential Substitutes | |
|---|--|--|
| | Comparable | Alternative |
| 2S1 (122-mm RS) | Abbot (105-mm UK) Type 85 (122-mm CH) | M1977 (122-mm KN)(-) Type 54-1 (122-mm CH)(-) 2S23 (120-mm SP Combo Gun/ BTR-80 RS)(*) 2S9 (120-mm SP Combo Gun/ BTR-D RS)(*) |
| 2S3 (152-mm RS) | Dana (152-mm CZ) Palmaria (155-mm IT) M109A1/3 (155-mm US) | M1974 (152-mm KN)(-) AS-90 (155-mm UK)(+) AU-F1 (155-mm FR)(+) G6 (155-mm SF)(+) 2S19 (152-mm RS)(+) |
| 2S5 (152-mm RS) | None | Catapult (130-mm IN)(-) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Rocket Launcher Substitution Matrix

| Baseline Systems | Potential Substitutes | |
|---|--|---|
| | Comparable | Alternative |
| Single-Tube Rocket Launcher BM-21P (122-mm RS) | SAKR PRL-111 (122-mm EG) | SAKR PRL-81 (107-mm EG)(-) SAKR-4 (4-Tube 122-mm MRL EG)(+) |
| Multiple Rocket Launcher BM-21 (122-mm RS) | SAKR RL-21 (122-mm EG) M-77/Oganj (128-mm SR) Firos (122-mm IT) Astros II (127-mm BR) | Type 85 (130-mm CH)(-) RM-70 (122-mm CZ)(+) M51 (130-mm CZ)(-) |
| Multiple Rocket Launcher RPU-14 (140-mm RS) | Type 63 (107-mm CH) | LAU-97 (70-mm BE)(*) Type 81 (107-mm CH)(*) M-63 (128-mm SR)(*) |
| Multiple Rocket Launcher 9P140/BM-22 (220-mm RS) | Astros II (180-mm BR) M1985 (240-mm KN) | M-87/Orkan (262-mm SR)(+) M1991 (240-mm KN)(+) BM-24 (240-mm RS)(-) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Artillery Rocket and Surface-to Surface Missile Substitution Matrix _____

| Baseline Systems | Potential Substitutes | |
|---|----------------------------|--|
| | Comparable | Alternative |
| FROG-7 (RS) | Layth (IZ) | SS-21/SCARAB (RS)(+) Nazeat (IR)(+) |
| SS-21/SCARAB (RS) | Prithvi (IN) B-610 (CH) | Nazeat (IR)(-) |
| SS-1c/SCUD B | M-11 (CH) | M-9 (CH)(+) SCUD C (KN)(+) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Antitank Weapon Substitution Matrix

| Baseline Systems | Potential Substitutes | |
|---|---|--|
| | Comparable | Alternative |
| Disposable ATRL RPG-18 (64-mm RS) RPG-22 (72-mm RS) | M72 LAW (66-mm US) AT-4 (84-mm SW) C90-C (90-mm SP) | RPG-27 (105-mm RS)(+) Hornet RBR (120-mm SR)(+) RPO-A Flamethrower (110-mm RS)(*) |
| ATGL RPG-7V (40-mm RS) RPG-16D (58-mm RS) | Type 69 (40-mm CH) Panzerfaust-3 (60-mm GM) Carl Gustaf M-2/M-3 (84-mm SW) | RPG-2 (40-mm RS)(-) RPG-29 (105-mm RS) (+) Folgore (80-mm IT)(*) Hornet-S (120-mm SR)(*) RPO Flamethrower (110-mm RS)(*) |
| Recoilless Gun: SPG-9 (73-mm RS) | M-60A (82-mm SR) M79 (82-mm SR) CAN-90L (90-mm BE) | B-10 (82-mm RS)(-) B-11 (107-mm RS)(-) M40A1 (106-mm US)(+) |
| Antitank Gun T-12/MT-12 (100-mm RS) | M87/Topaz (100-mm SR) | ZIS-3 (76-mm RS)(-) SD-44 (85-mm RS)(-) BS-3 (100-mm RS)(-) 2A45M (125-mm RS)(+) ASU-57 (57-mm Assault Gun RS)(*) ASU-85 (85-mm Assault Gun RS)(*) SU-100 (100-mm Assault Gun RS)(*) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

(continued)

Antitank Weapon Substitution Matrix (continued)

| Baseline Systems | Potential Substitutes | |
|---|--|--|
| | Comparable | Alternative |
| ATGM Manpack AT-7/SAXHORN (RS) | Dragon (US) | AT-4/SPIGOT (RS)(+) AT-13/Metis-2 (RS)(+) AT-3/Malyutka-2 (RS)(*) Milan (FR)(+) Eryx (FR)(*) |
| ATGM Manpack AT-4/SPIGOT (RS) | Red Arrow 8 (CH) HOT (FR) TOW (US) | AT-14/Kornet(RS)(+) RBS-56/Bill (SW)(*) AT-5/SPANDREL (Ground/Vehicle-Launched RS)(*) |
| ATGM Vehicle 9P133 (BRDM-2 with AT-3/SAGGER)(RS) | VAB/Milan (FR) | M60PB AT (SR)(-) |
| ATGM Vehicle 9P148 (BRDM-2 with AT-5/SPANDREL) (RS) | VCR/TH with HOT (FR) M901/ITOW (US) Striker/Swingfire (UK) | 9P137 (BRDM-2 with AT-2c/SWATTER C (RS)(-) Rooikat 35/ZT-3 (SF)(+) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Antiaircraft Gun Substitution Matrix

| Baseline Systems | Potential Substitutes | |
|---|--|--|
| | Comparable | Alternative |
| ZPU-2/-4 (14.5-mm RS) | Type 56 (14.5-mm CH) Type 58 (14.5-mm CH) Type 75 (14.5-mm CH) Type 80 (14.5-mm CH) | M-53 (12.7-mm CZ)(-) |
| ZU-23 (23-mm RS) | Type 80 (23-mm CH) | Type 85 (25-mm CH)(+) M1990 (30-mm KN)(+) |
| ZSU-23-4 (23-mm SP AA Gun RS) | M1992 (30-mm KN) | Marksman (35-mm UK)(+) |
| M1939 (37-mm RS) | Type 55 (37-mm CH) | Bofors L/70 (40-mm SW)(+) |
| S-60 (57-mm RS) | Type 59 (57-mm CH) | KS-12 (85-mm RS)(+) KS-19 (100-mm RS)(+) ZSU-57-2 (57-mm SP AA Gun RS)(*) Type 80 (57-mm SP AA Gun CH)(*) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Surface-to-Air Missile Substitution Matrix

| Baseline Systems | Potential Substitutes | |
|---|--|--|
| | Comparable | Alternative |
| First-Generation Shoulder-Fired SAM SA-7/GRAIL (RS) | HN-5 (CH) Redeye (US) SAKR-Eye (EG) Blowpipe (UK) | (See Second- and Third-Generation Shoulder-Fired SAM, below) (+) |
| Second- and Third-Generation Shoulder-Fired SAM SA-14/GREMLIN (RS) SA-16/GIMLET (RS) SA-18/GROUSE (RS) | Stinger RMP (US) Mistral (FR) RBS-70 (SW) Vanguard (CH) | (See First-Generation Shoulder-Fired SAM, above)(-) |
| SA-6/GAINFUL (RS) | RF-161A (CH) | SA-8/GECKO (RS)(+) |
| SA-8/GECKO (RS) | Roland II (FR) | SA-6/GAINFUL (RS)(-) |
| SA-9/GASKIN (RS) | None | SA-13/GOPHER (RS)(+) Chaparral (US)(+) |
| SA-2/GUIDELINE (RS) SA-3/GOA (RS) | HQ-1 (CH) HQ-2 (CH) | SA-5/GAMMON (RS)(+) SA-10c/GRUMBLE (RS)(+) |
| SA-4/GANEF (RS) | None | SA-11/GADFLY (RS)(+) |
| SA-11/GADFLY (RS) | None | Crotale NG (FR)(-) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |

Attack Helicopter Substitution Matrix _____

| Baseline Systems | Potential Substitutes | |
|---|-----------------------|---|
| | Comparable | Alternative |
| Mi-24 (Mi-25)/HIND D/E/F (RS) | None | Hughes 500 Defender (US)(-) SA 342 Gazelle (FR)(-) |
| KEY: (+) More capable. (-) Less capable. (*) Different capabilities for special uses. | | |